

Assessment of Knowledge, Attitude and Practices about Rabies and Associated Factors: In the Case of Bahir Dar Town

¹Tadesse Guadu, ¹Anmaw Shite, ²Mersha Chanie, ²Basazinew Bogale and ³Tewodros Fentahun

¹University of Gondar, Faculty of Veterinary Medicine, Unit of Veterinary Epidemiology
and Public Health, P.O.Box 196, Gondar, Ethiopia

²University of Gondar, Faculty of Veterinary Medicine,
Unit of Veterinary Paraclinical Studies, P.O.Box 196, Gondar, Ethiopia

³University of Gondar, Faculty of Veterinary Medicine,
Unit of Basic Veterinary Sciences, P.O.Box 196, Gondar, Ethiopia

Abstract: This study was conducted in Bahir Dar town, from November, 2013 to April, 2014 to assess the knowledge, attitudes and practices (KAP) on rabies and associated factors among the community of Bahir Dar town. A cross-sectional study design and multistage sampling procedures were employed to select households for this study. Administrative areas were randomly selected from the town. Kebeles were selected using lottery method from list of kebeles in each administrative area, followed by selection of households from each kebeles using systematic random sampling method. The data were collected from 423 households through face to face interview using pretested and structured questionnaires. SPSS Windows version 16.0 was used for data analysis. Descriptive statistics techniques and Pearson's chi squares analysis were used to manage the data and the association between outcome (KAP) and explanatory variables. Of the 410 respondents interviewed, 283 (69%) of them were males and 127 (31%) females and 303 (73.7%) were between 15-29 years old. The majority of the respondents 303 (73.7%) were Orthodox. Almost all of the respondents indicated that they had previously heard about rabies. The majority of the study participants 263 (64.1%) had good level of KAP. There was strong association between KAP scores and sex ($\chi^2=69.624$, $p<0.05$); educational level ($\chi^2=1.893$, $p<0.05$); occupation ($\chi^2=58.554$, $p<0.05$) and household size ($\chi^2=38.069$, $p<0.05$). Generally these findings indicate that the Bahir Dar community has good knowledge about rabies. But a need for educational outreach in Bahir Dar town to raise accurate knowledge on mode of transmission, symptoms and appropriate prevention and treatment measures.

Key words: Attitude • Community • Knowledge • Practice • Rabies

INTRODUCTION

Rabies is encephalitis, almost inevitably fatal zoonotic disease. Etiologic agent of this disease is the rabies virus belonging to the genus *Lyssavirus* and family Rhabdoviridae [1]. It has worldwide distribution. Humans and nearly all mammals are susceptible. Beside poliomyelitis and pox, rabies is one of the longest known infectious diseases in human history [2]. Rabies virus infection most commonly occurs when a rabid animal bites an animal or a person. Rabies also occurs when infected saliva from a rabid animal contaminates an open wound,

a scratch or skin abrasion, or a mucous membrane [3]. In domestic animals, the incubation period is generally 3-12 weeks but can range from several days to months, rarely exceeding 6 months [4, 5]. Clinical signs of this disease appear following migration of the virus from the bite site to the central nervous system, the duration of which is highly variable depending on several factors including the distance of the bite site to the brain [6].

Rabies is endemic in developing countries of Africa and Asia and most human deaths from the disease occur in these endemic countries. Human mortality from endemic canine rabies was estimated to be 55, 000 deaths per year

Corresponding Author: Tadesse Guadu, University of Gondar, Faculty of Veterinary Medicine,
Unit of Veterinary Epidemiology and Public Health, P.O.Box 196, Gondar, Ethiopia.

and was responsible for 1.74 million disability adjusted life years (DALYs) losses each year. The annual cost of rabies in Africa and Asia was estimated at US\$ 583.5 million most of which is due to cost of post exposure prophylaxis (PEP) [7, 8]. Ethiopia being one of the developing countries is highly endemic for rabies. Approximately 10, 000 people were estimated to die of rabies annually in Ethiopia which makes it to be one of the worst affected countries in the world [9]. Dogs are the principal source of infection for humans and livestock [9]. Although rabies is primarily a disease of dogs in Ethiopia, other domestic and wild animals have also been affected. It is also a common problem among human population because of high rate of man to dog contact [10]. There is however, lack of information to determine the magnitude of rabies in man and other domestic animals in the country [11, 12].

In Ethiopia individuals who are exposed to rabies virus often see traditional healers for the diagnosis and treatment of the disease. These widespread traditional practices of handling rabies cases are believed to interfere with timely seeking of PEP. Rabies victims especially from rural areas seek PEP treatment after exhausting the traditional medicinal intervention and usually after a loss of life from family members [9, 13, 14].

The available information on rabies in Ethiopia is largely based on passive reports to Ethiopian Health and Nutrition Research Institute zoonoses laboratory [11], the only rabies diagnostic laboratory in the country. There is lack of accurate quantitative information on rabies both in humans and animals and little is known about the awareness of the people about the disease to apply effective control measures in Ethiopia. The objectives of the present study are to assess knowledge, attitude and practices (KAP) about rabies and associated factors among the community of Bahir Dar town.

MATERIALS AND METHODS

Study Area: The study was conducted from November, 2013 to April, 2014 in Bahir Dar town, the capital city of Amhara national regional state, 578 km Northwest of Addis Ababa, located between 12°29'N latitude and 37°29'E longitude. The average annual rain fall ranges from 1200-1600 mm and temperature 8-31°C. The altitude of the area ranges between 1500m-2300m above sea level. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia [15], Bahir Dar Special Zone has a total population of 221,991, of whom 108,456 are men

and 113,535 women; 180,174 or 81.16% are urban inhabitants, the rest of population are living at rural kebeles around Bahir Dar. At the town of Bahir Dar there are 155,428 inhabitants; the rest of urban population is living at Meshenti, Tis Abay and Zege towns which are part of Bahir Dar Special Zone.

Study Design: Community based cross-sectional quantitative study design was used to assess the knowledge, attitudes and practices (KAP) on rabies and associated factors among the community of Bahir Dar town.

Study Population: Community of Bahir Dar town living in three randomly selected administrative areas (Sefene selam, Fasilo and Tana).

Sample Collection and Sample Size Determination: The required sample size for this study was estimated by considering 50% of population knowing about rabies since there is no awareness study on rabies in the area before. Thus, the sample size was calculated according to Thursfield [16] using 95% confidence interval and 0.05 absolute precision. This is calculated by using the following formula:

$$n = \frac{1.96^2 \times P_{\text{exp}} (1 - P_{\text{exp}})}{d^2}$$

where

n = Required sample size.

P_{exp} = Expected proportion of population knowing about rabies are 50%.

d² = Desired absolute precision (0.05)

As a result, 385 study population was selected, 10% non response rate,

Total sample size = **423 subjects.**

Sampling Method, Data Collection Tools and Procedures: A multi-stage sampling technique was employed for the selection of the sampling units. From the entire Primary sampling unit, i.e. 9 administrative areas, 3 were selected by simple random sampling technique. Kebeles were selected from each administrative area by lottery method. The number of households to be included in each administrative area was determined by

proportional allocation based on the total number of households found in each kebele. From the entire tertiary sampling unit, Individual household, in the selected kebeles was selected using a systematic random sampling technique. From each selected household was further selected by simple random sampling technique and interviewed. A pretested structured questionnaire consisting of closed ended questions was used for this study. The data were collected via interview. The questionnaire was first developed in English and then translated in to Amharic language (native language) for appropriateness and easiness in approaching the study participants.

Data Management and Analysis: After collecting, the data were cleaned and checked for its completeness. Those incomplete and inconsistent were corrected when possible and removed otherwise. After complete check-up the data were coded and entered to Microsoft Excel and transport to SPSS version 16.0 statistical packages for windows and analysis made. The frequency distribution of both dependent and independent variables were worked out by using descriptive statics techniques (Frequencies, mean, SD and percentage). Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square.

RESULTS

Socio-Demographic Characteristics: A total of 410 respondents were responded to the questioner, which yields a response rate of 96.9%. More than half 283 (69.0%) of the interviewed were males. Regarding age group, 303 (73.3%) of the study participants were between 15-29 years old. The majority of the respondents 304 (73.7%) were Orthodox followed by Muslim 118 (14.4%). Concerning educational status, 155 (37.7%) of the participants had completed college. From the total respondents about 142 (34.5%) were government employees. Regarding family size, 224 (54.5%) participants were from family size of one to three persons and similarly 165 (40.1%) study participants reported that their monthly incomes were above 2000 birr (Table 1). Three hundred fifty six (86.6%) of respondents heard information from informal sources, such as traditional healers neighbors, friends and relatives and 44 (10.7%) of study participants from formal (Radio/Television, Books/magazines) and others 10 (2.4%) from mixed sources. Eighty Five (20.7%) of respondents had a dog and 249 (60.6%) of study participants were experience on previous animal bite.

Table 1: Socio-demographic information of the study participants in Bahir Dar town (N= 410), 2014.

Sociodemographic characteristics	Frequency/number	Percent
Sex		
Male	283	69
Female	127	31
Age (in years)		
15-29	303	73.3
30-45	85	20.7
>45	22	5.6
Household size		
1-3	224	54.5
4-6	110	26.8
>6	76	18.5
Monthly Income(birr)		
1000	96	23.4
1001-2000	149	36.3
>2000	165	40.1
Educational status		
Illiterate	41	10
Primary school (1-8)	32	7.8
Secondary school (9-10)	107	26
College	155	37.7
First degree and above	76	18.5
Occupation		
Government employees	142	34.5
Private employees	13	3.2
Merchant	192	46.7
Unemployed	53	12.9
Others	10	2.4
Religion		
Orthodox	303	73.7
Muslim	53	12.9
Protestant	35	8
Catholic	21	5.1

Community KAP about Rabies in Bahir Dar town:

Twenty nine questions were asked for each respondent regarding cause, sources and mode of transmissions, clinical sings and prevention practices and treatment measures of rabies. Which was resulted in a response of either, choose the correct answer (had got one mark) or wrong answer (had got zero mark) for each question. The number of questions for which the respondent gave correct responses was counted and scored. This score was then pooled together and the mean score was computed to determine the overall KAP of respondents, Respondents who score greater than or equal to the mean value (Mean=6.41, SD=1.56) grouped to good KAP and less than the mean value Poor KAP level.

The data show that about two hundred sixty three (64.1%) of the study participants were found to have good KAP about rabies and one hundred fourty seven (35.9%) were found to have poor KAP level.

Table 2: Knowledge of participants related to cause, mode of transmissions and host range of rabies in Bahir Dar town (N=410), 2014

Characteristics	Frequency/number	Percent
Cause of rabies		
Psychological problem	10	2.4
Associated with spirit	32	7.8
Virus	32	60.1
Shortage of feed and water	99	24.1
I do not know	22	5.7
Susceptible hosts		
Human	54	13.1
Dog	20	4.9
Cattle		
Equines		
Sheep and Goat		
Wild animals		
Human and dogs	88	60.3
All of these	248	21.4
Transmitted from animal to human		
Yes	390	94.9
No	20	5.1
Mode of transmission from rabid animal to other animals/human		
Biting		
Scratching	192	46.7
Licking open wound/ mucous membrane		
All	33	8
	18	45
Most common source of rabies		
Dog	293	71.3
Cat	95	23.1
Others	22	5.4

Table 3: Knowledge of participants related to clinical signs and fatal nature of rabies in Bahir Dar town (N=410), 2014.

Characteristics	Frequency/number	Percent
Clinical signs		
Stops eating and drinking	52	12.7
Biting and change in behavior		
Paralysis	22	5.4
Salivation	21	5.1
Hydrophobia		
All of these	315	76.8
Easily treated after the onset of clinical signs		
Yes	164	39.9
No	226	55.2
I don't know	20	4.9
Fatal nature of the rabies		
Yes	390	94.9
No	20	5.1

Knowledge of Participants Related to Cause, Mode of Transmissions and Host Range of Rabies: Almost all (99%) respondents were familiar with the disease and gave it slightly different local names (e.g. 'Kelebat', 'Likefit', 'Yebed wusha beshata') which all mean madness. Of those respondents, 247 (60.1%) were know that virus is the cause of rabies, 390 (94.9%) were know that rabies transmitted from animal to human and, 293 (71.3%) were aware that dog is the most common source of rabies (Table 2).

Table 4: Practices and attitudes to prevent rabies after suspected animal/dog bite in Bahir Dar town (N=410), 2014.

Characteristics	Frequency/number	Percent
Immediate action after bite of rabid animal at home		
Tie the wound with cloth	76	18.5
Wash with water and soap	291	70.8
apply herbal extract	10	2.4
I don't know	33	8.3
Seek after bite of rabid animal	207	50.4
Health center(vaccination)	162	41.2
Traditional healer	41	9.4
Holly water		
Attitude to anti-rabies vaccine	176	42.8
Positive	234	56.9
Negative		
At which stage of anti-rabies vaccine is effective after a suspected animal bite		
Immediately	229	55.7
Later	10	2.4
At any time	129	31.4
I don't know	42	10.2
Actions taken for rabid animals	11	2.7
Let free	76	18.7
Tie	323	78.6
Killing		
Measures to control stray dogs		
Killing	184	44.8
Animal birth control	32	7.8
Aware the owner	63	15.5
Ting	131	31.9

Knowledge of Participants Related to Clinical Signs and Fatal Nature of Rabies: Three hundred ninety (94.9%) of study participants answered that rabies is a dangerous and fatal disease.

Practices and Attitudes to Prevent rabies after Suspected Animal/dog Bite: Two hundred ninety one (70.8%) of the respondents washed the wound with water and soap immediately, 207 (50.4%) seek health center, 176 (42.8%) had positive attitude for anti-rabies vaccine and 229 (55.7%) were aware of taking anti-rabies vaccine immediately after a suspected animal/dog bite.

Factors Associated with Community KAP on Rabies in Bahir Dar Town: Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square (Table 5). There was significantly association between KAP scores and sex ($\chi^2=69.624$, $p < 0.05$). The good scores were higher in males (53.4%) than females (10.7%). Educational status was significantly associated with KAP scores ($\chi^2=1.893$, $p < 0.05$). All respondents with first degree and above education levels had good KAP of rabies.

Table 5: Relationships between KAP scores about rabies and some key independent variables among study respondents of Bahir Dar town (N=410), 2014.

Variables	Good	Poor	χ^2	P value
Sex				
Male	129(53.4%)	64(15.6%)	69.624	0
Female	44(10.7%)	83(20.2%)		
Age (in years)				
15-29	187(45.6%)	116(28.3%)	13.089	0.01
30-45	54(13.2%)	31(7.6%)		
>45	22(5.4%)	0(0%)		
Household size				
1-3	151(36.8%)	73(17.8%)	38.069	0
4-6	47(11.5%)	63(15.4%)		
>6	65(15.9%)	11(2.7%)		
Monthly Income(birr)				
1000	45(11%)	51(12.4%)	33.16	0
1001-2000	86(21%)	639(154%)		
>2000	132(32.2%)	33(8%)		
Educational status				
Illiterate	0(0%)	41(10%)	1.893	0
Primary school (1-8)	0(0%)	32(7.8%)		
Secondary school (9-10)	64(15.6%)	42(10.2%)		
College	123(30%)	32(7.8%)		
First degree and above	76(18.5%)	0(0%)		
Occupation				
Government employees	120(29.3%)	22(5.4%)	58.554	0
Private employees	3(0.7%)	10(2.4%)		
Merchant	108(26.3%)	84(20.4%)		
Unemployed	32(7.8)	21(5.1%)		
Others	0(0%)	10(2.4%)		
Religion				
Orthodox	187(45.6%)	116(28.3%)	8.782	0.32
Muslim	43(10.5%)	10(2.4%)		
Protestant	22(5.4%)	11(2.7%)		
Catholic	11(2.7%)	10(2.4%)		
Source of information				
Formal	24(5.9%)	20(4.9%)	21.037	0.06
Informal	239(58.9%)	117(28.5%)		
Mixed	0(0%)	10(2.4%)		
Dog ownership				
Yes	225(54.9%)	110(26.8%)	7.252	0.07
No	38(9.3%)	37(9%)		
Family exposure to animal bite				
Yes	89(21.7%)	72(17.6%)	9.062	0.08
No	174(42.4%)	76(18.3%)		

DISCUSSIONS

The findings of this study indicated that, about 64.1% of the respondents had good level of knowledge, attitude and practices about rabies. In contrast to this finding higher knowledge, more positive attitudes and higher scores in practice indicators regarding rabies was

reported from Sri Lanka [17]. This difference probably is explained by the lack of health education programs about rabies in Ethiopia. Almost all respondents had heard about rabies from different sources. This finding was higher when compared with that reported lower proportion (68.7%) in a survey of knowledge, attitudes and practices about animal bite and rabies in general community in India and in Zimbabwe, but KAP level in these countries is higher [18]. This is mainly because of the fact associated with the source of information determining the appropriateness of the knowledge transferred. This is supported by the result obtained in this study that only 10.7% of respondents receive information about rabies from mass media (formal source). However, such information tended to be superficial and it did not adequately enable public to acquire appropriate level of knowledge on rabies.

Of those respondents, 39.9% had misunderstanding on the cause of rabies. This result is lower when compared with the result obtained from study conducted in Gondar and Dabat, Ethiopia indicated that most of respondents believe that the disease in dogs is caused by starvation; thirst and prolonged exposure to sun heat [19]. This could be due to study area and community awareness difference.

In the present study, 45% respondents knew the correct mode of transmission which is consistent with the finding of Lai [20], who reported that 49.2% answered correctly concerning transmission. However, the study conducted in Addis Ababa [21] among the community indicated that higher proportion of study participants had correct responses regarding the route of exposure compared to the result found in this study which could be due to better source of information.

This KAP analysis revealed that 94.5% of respondents recognize rabies as danger and a fatal disease, 21.4% know that all warm blooded animals are susceptible to rabies and 71.3% aware that dogs are the most common source of rabies. This result is consistent with a study conducted in the city of New York, USA reported that 94.1% of the study participants know rabies as a killer disease and 73.5% of the respondents identified that dogs are major sources for the spread of rabies in human population [22]. However, in this study, majority of the respondents (71.9%) know that rabies can affect all warm blooded animals. A study conducted in canine rabies endemic countries also testify similar results [23]. About 76.8% of the respondents were aware of common clinical signs of rabies in animals. This finding is supported by study done in Nigeria [24].

The good scores were higher in males (53.4%) than females (10.7%). The statistically significant difference ($P<0.001$) in KAP score between males and females might be due to increased activity of males in their daily life compared with females and better chance of acquiring correct information about rabies. The other factor that identified to be significantly associated with knowledge on rabies was educational status. Statistically significant association ($P<0.001$) was observed between KAP score and educational levels where by higher levels of educations were associated with higher knowledge scores. All respondents with first degree and above education levels had good KAP of rabies. The possible explanation could be educated person would have better information access and can easily understand the disease. This result is also supported by the result of the studies conducted in Flagstaff [25].

This study found that, 70.8% of the respondents know that wound washing is immediate action after dog bite. This result highly lower than studies done in Bhutan [26]. This difference might be due to respondents believed that the infection could be treated with herbs. Half of respondents (50.4%) sought medical care from health centers after being bitten by dogs, in contrast in Sri Lanka almost all respondents agreed to consult health professional in case of animal bite (Gino *et al.*, 2009). This may be due to lack information and unavailability of health centers in immediate vicinity. In agreement with India's surveyed population (42%) preferred household treatment such as chili application [27], 49.6% participants of this study had strong belief on traditional medicine. The majority of the respondents indicated depopulation of stray dogs is effective measure for controlling the disease in Bahir Dar. This finding was consistence with results recorded in Sri Lanka in which the majority of the participants were in favor of rabies control programs that mainly focused on stray dog population control [17].

CONCLUSION AND RECOMMENDATIONS

In conclusion, this study has shown that the community level KAP about rabies is good in the study area, despite this fact, still there are some KAP gaps in the community regarding the modes of rabies transmission, clinical signs of rabies, prevention methods after suspected animal bite, the first action taken in the home after bitten by a suspected animal (wound washing with soap and water) and attitude to anti-rabies vaccine. Sex, age, educational status, occupational status and house hold size of the respondents were the variables

found to be significantly associated with KAP on rabies. Therefore, based on the above conclusion the following recommendations are forwarded:

- The Bahir Dar Health Office Administration should provide periodic education to raise community knowledge on rabies and provide accurate information targeted to people who have lower educational level, housewives or females more commonly present at home and small number of children in the household (limited social communication).
- The Amhara Regional Health Bureau should also design accurate and urgent Community based rabies education program with emphasis on mode of transmission, clinical signs and immediate benefits of wound management and need for Anti-rabies vaccine following dog bite.
- The Federal Ministry of Health and Ministry of Agriculture should work in cooperation with information sources like radio, television programs and newspapers to forward information related to rabies for enhancing the level of knowledge of the community about the deadly nature of the disease and the availability of preventive measures like vaccinations both for human and animals.
- Furthermore, the respective Federal Offices should increase the availability and distribution of vaccine in different health centers.

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REFERENCES

1. WHO, 2005. Expert Consultation on Rabies. WHO Technical Report series, pp: 931.
2. Krauss, H., A. Weber, M. Appel, B. Enders, H.D. Isenbers, H.G. Shiefer, W. Slenczka, A.V. Graevenitz and H. Zahner, 2003. Zoonoses: infectious disease transmissible from animals to humans. 3rd ed. Canada: American society for Microbiology, pp: 113-118.

3. Rupprecht, CE., R. Willoughby and D. Slate, 2006. Current and future trends in the prevention, treatment and control of rabies. *Expert Review of Anti-infective Therapy*, 4: 1021-38.
4. Alan, J.C., 2005. Prevention and Therapy of Virus Infection. In: *Principles of Molecular Virology*. 4th ed. United States: Elsevier Academic Press, Burlington, pp: 1-20.
5. Cleaveland, S., EM. Fevre and M. Kaare, 2002. Estimating human rabies mortalities in the United Republic of Tanzania from dog bites injuries. *Bulletin of World Health Organization*, 80: 304-10.
6. Parry E., R. Godfrey, D. Mabey and G. Gill, 2004. *Principles of medicine in Africa*. 2nd ed. Singapore: Cambridge University press, pp: 714-721.
7. Knobel, D.L., S. Cleaveland, P.G. Coleman, E.M. Fevre and M.I. Meltzer, 2005. Re-evaluating the burden of rabies in Africa and Asia. *Bulletin of the World Health organization*, 83: 360-368.
8. Fekadu, M., 1997. Human rabies surveillance and control in Ethiopia. In: *proceeding of the southern and eastern African rabies group meeting 1997*. March 4-6; Nairobi, Kenya.
9. Deressa, A., A. Ali, M. Beyene, B. Newaye and E. Yimer, 2010. The status of rabies in Ethiopia: A retrospective record review. *Ethiopian Journal of Health Development*, 24: 127-132.
10. Eshetu, Y., N. Betelhem, T. Girma, M. Yared, B. Yosef, Z. Badeg, B. Mekero and B. Abebe, 2002. Situation of rabies in Ethiopia, a retrospective study 1990-2000. *Ethiopian Journal of Health Development*, 16(1): 105-112.
11. Paulos, A., Y. Eshetu, N. Bethelhem, B. Abebe and Z. Badeg, 2003. A study on the prevalence of animal rabies in Addis Ababa during 1999-2002. *Ethiopian Veterinary Journal*, 7: 69-77.
12. Hatfield, G., 2004. *Encyclopedia of folk medicine: old world and new world traditions*. Santa Barbara (CA): ABC-CLIO, pp: 23-47.
13. Mahawar, M.M. and D.P. Jaroli, 2007. Traditional knowledge on zoo therapeutic uses by the Saharia tribe of Rajasthan, India. *J. Ethnobiol Ethno med*, 3: 25.
14. Jackson, C.A. and H.W. Wunner, 2002. *Rabies*. 2nd ed. United States: Elsevier Science, pp: 20-412.
15. Central Statistical Authority (CSA), 2008. Sample enumeration report on livestock and farm implement IV, Addis Ababa, Ethiopia, pp: 26-136.
16. Thursfield, M., 2005. *Survey in Veterinary Epidemiology*. 2nd ed. UK: Blackwell Science, Limited, Cambridge, pp: 297-302.
17. Gino, C., O. Yoshihide, K. Koji, Y. Hiroko, R. Bandula and P. Gamini, 2009. A pilot study on the usefulness of information and education campaign materials in enhancing the knowledge, attitude and practice on rabies in rural Sri Lanka. *Journal Infect Developing Countries*, 3(1): 55-64.
18. Ichhupujani, R., M. Chhabra, V. Mittal, D. Bhattacharya and S. Lal, 2006. Knowledge, Attitude and Practices about animal bites and rabies in general community -a multi-centric study. *Journal of communicable Disease*, 38(4): 355-361.
19. Wudu, T., M. Wassie, A. Gizat and A. Sefinew, 2013. Incidence of Rabies in Humans and Domestic Animals and People's Awareness in North Gondar Zone, Ethiopia. *Plos Neglected Tropical Diseases*, 7: 5.
20. Lai, P., A. Rawat, A. Sagar and K. Tiwari, 2005. Prevalence of Dog bite in Delhi: Knowledge and Practices of residents regarding prevention and control of rabies. *Health and Population perspectives and Issues*, 28(2): 50-57.
21. Abraham A., Y. Eshetu and S. Desalegn, 2013. A Study on Knowledge, Attitude and Practice of rabies among residents in Addis Ababa, Ethiopia. *Ethiopian Veterinary Journal*, 17(2): 19-35.
22. Eidson, M., S. Kate, K. Mary, T. Charles and W. Amy, 2004. Development and evaluation of bat rabies education materials. *Evidence based Preventive Medicine*, 1(2): 85-91.
23. Syed, F., J. Munazza, N. Shanila, A. Sumaira and S. Faisal, 2009. Knowledge and Practices among the general practitioners of Karachi regarding dog bite management. *Journal of Pakistan medical Association*, 59: 861-864.
24. Asabe, A., S. Ayuba and U. Jarlath, 2012. Knowledge and Practice about Rabies among Children Receiving Formal and Informal Education in Samaru, Zaria, Nigeria. *Health Science*, 4(5): 132.
25. Andrea, M. and D. Jesse, 2012. Community Survey after Rabies Outbreaks, Flagstaff, Arizona, USA. *Emerging Infectious Disease Journal*, 18: 6.
26. Tenzin, N. and D. Bir, 2013. Community-based study on knowledge, attitudes and perception of rabies south-central Bhutan. In *Health Oxford Journals*, 4(3): 210-219.
27. Agarwal, N. and V.P. Reddaiah, 2003. Knowledge, attitude and practice following dog bite: a community-based epidemiological study. *Perspectives and Issues*, 26: 154-161.